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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/651,220	08/28/2003	Greg Monty	12179-P117US	7642
7590 04/23/2004			EXAMINER	
Winstead Sechrest & Minick P.C. 1201 Main Street P.O. Box 50784 Dallas, TX 75250-0784			HUYNH, ANDY	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 04/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/651,220	MONTY ET AL.	
	Examiner	Art Unit	
	Andy Huynh	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 16 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>01/23/04</u> | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Election/Restrictions

In the Response to Restriction Requirement dated February 2, 2004, Applicant has elected Invention of Group I (claims **1-16**) drawn to a device, and has canceled claims **17-20** without prejudice is acknowledged. Accordingly, claims **1-16** remain pending in the application, which claims benefit of 60/407,141 filed August 30, 2002.

Information Disclosure Statement

This office acknowledges receipt of the following items from the applicant: Information Disclosure Statement (IDS) filed January 23, 2004. The references cited on the PTOL 1449 form have been considered.

Claim Rejections - 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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Claims **1-6 and 10-14** are rejected under 35 U.S.C. 102(e) as being anticipated by Penner et al. (US Pub. No.: 2003/0079999 A1, dated 5/1/03, filed 5/30/02, hereinafter referred to as Penner).

Regarding claim **1**, Penner discloses in Fig. 1-3 and related texts as set forth in [0033]-[0039] a hydrogen sensor/a hydrogen gas sensor (10) comprising:

- a) a dielectric surface material/a polystyrene adhesive film (18); and
- b) at least one metal nanowire (11) comprising Pd and Ag (Page 2, [0033]) on said dielectric surface/the polystyrene adhesive film,

wherein said metal nanowire comprises at least one nanobreakjunction (19) which closes when exposed to a threshold hydrogen concentration (Page 3, [0037]).

Regarding claim **2**, Penner discloses in Fig. 1A the hydrogen sensor of claim **1**, further comprising electrodes/electrical contacts (14) in contact with said metal nanowire (Page 2, [0033]).

Regarding claim **3**, Penner discloses in Fig. 1A the hydrogen sensor of claim **2**, further comprising a power supply/a power source (15) connected to said electrodes so as to form a circuit (Page 2, [0033]).

Regarding claim **4**, Penner discloses the hydrogen sensor of claim **3**, further comprising a device/a conventional potentiostat (not shown) or triggering an appropriate alarm or control circuit (not shown) for measuring one or more electrical properties of said metal nanoparticles within said circuit (Page 2, [0034]).

Regarding claim 5, Penner discloses the hydrogen sensor of claim 1, wherein solvation of hydrogen in the metal nanowire effects an electrical response at some threshold concentration by closing said nanobreakjunctions (Page 6, [0064]).

Regarding claim 6, Penner discloses the hydrogen sensor of claim 5, wherein said electrical response is selected from the group consisting of a change in resistivity, a change in conductivity, a change in capacitance, a change in conductivity, and combinations thereof (Page 3, [0037]).

Regarding claim 10, Penner discloses in Fig. 1-3 and related texts as set forth in [0033]-[0039] a hydrogen sensor/a hydrogen gas sensor (10) comprising:

- a) a dielectric surface material/a polystyrene adhesive film (18); and
- b) one or more columns of metal nanoparticles/nanowires (11) (Page 2, [0033]) on said surface/the polystyrene adhesive film, wherein nanogaps/break junctions (19) between the nanoparticles/nanowires close when exposed to a threshold hydrogen concentration (Page 3, [0037]).

Regarding claim 11, Penner discloses in Fig. 1A the hydrogen sensor of claim 10, wherein closure of said nanogaps/break junctions effects a detectable electronic response along the column of nanoparticles/nanowires when said column is incorporated into an electrical circuit (Page 2, [0033], page 3, [0037] and page 6, [0064]).

Regarding claim 12, Penner discloses the hydrogen sensor of claim 11, wherein said electrical response is selected from the group consisting of a change in resistivity, a change in conductivity, a change in capacitance, a change in conductivity, and combinations thereof (Page 3, [0037]).

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Regarding claim **13**, Penner discloses the hydrogen sensor of claim 11, wherein said metal nanoparticles/nanowires comprise Pd (Page 2, [0033]).

Regarding claim **14**, Penner discloses the hydrogen sensor of claim 11, wherein said metal nanoparticles/nanowires comprise alloys of Pd and Ag (Page 2, [0033]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Penner et al. (US Pub. No.: 2003/0079999 A1, dated 5/1/03, filed 5/30/02, hereinafter referred to as Penner).

Penner discloses the claimed limitations except for the hydrogen sensor of claim **1**, wherein the Ag content ranges from about 0 percent to about 26 percent. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to select the Ag content ranges from about 0 percent to about 26 percent, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Claim **8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Penner et al. (US Pub. No.: 2003/0079999 A1, dated 5/1/03, filed 5/30/02, hereinafter referred to as Penner) in view of Cheng et al. (USP: 5,670,115 hereinafter referred to as "Cheng").

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Penner discloses in Fig. 1A the claimed limitations the hydrogen sensor of claim 1, wherein multiple metal nanowires (16) within said sensor comprise varying compositions (Page 2, [0033]) so as to enable the detection of a range of hydrogen concentrations (Page 2, [0011]) except over a range of temperatures. Cheng teaches that a hydrogen sensor provides a fast response time in detecting hydrogen over a substantial range of hydrogen concentrations, and retains its utility at gas temperatures ranging from ambient to at least 150° C as set forth in column 1, lines 5-10. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to detect a range of hydrogen concentrations over a range of temperatures, as taught by Cheng in order to achieve a wider range of temperatures associated with a range of hydrogen concentrations for desired applications.

Claims 9 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Penner et al. (US Pub. No.: 2003/0079999 A1, dated 5/1/03, filed 5/30/02, hereinafter referred to as Penner) in view of Perdieu (USP: 6,120,835).

Penner discloses the claimed limitations except for the hydrogen sensor of claims 1 or 11, wherein said sensor provides for detection of hydrogen in transformers. Perdieu teaches that the palladium sensors are suitable to detect low levels of hydrogen in liquids, such as electrical transformer oil as set forth in column 11, lines 59-62. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to use the sensor for detection of hydrogen in transformer, as taught by Perdieu in order to detect low levels of hydrogen.

Allowable Subject Matter

Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and

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any intervening claims, since the prior made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. Penner, Perdieu and Cheng, taken alone or in combination, fail to teach or suggest the hydrogen sensor of claim 14, wherein multiple columns of metal nanoparticles comprise varying ratios of Pd and Ag so as to effect the detection of hydrogen over a range of concentrations with the same device.

Conclusion

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy Huynh, (571) 272-1781. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The Fax number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose phone number is (703) 308-0956.

AH

April 15, 2004



Andy Huynh

Patent Examiner